A Publication of Design For All Institute of India May 2019 Vol-14 No-5

Design for All

Design Research by Under 40 Researchers

Guest Editor: Dr. Emilio Rossi, Department of Architecture , University of Chieti-Pescara, Italy ***DOI: https://doi.org/10.6084/m9.figshare.8115818***

CONTENT OF MAY 2019 VOL-14 NO-5

https://doi.org/10.6084/m9.figshare.8115818

DESIGN OF KNOWLEDGE SHARING-ORIENTED COMMUNICATIVE PROCESSES FOR EMERGING COUNTRIES

Emilio Rossi [(1) (2)]

[1] ***Emilio Rossi Design Consulting. Ortona, Italy, erossidesign@gmail.com***

[2] ***Department of Architecture, University of Chieti-Pescara, Pescara, Italy***

Tacit knowledge can be defined as a particular form of knowledge used by people to address, deal and manage practical issues involving the immediate use of experience, abilities and manual skills. It is a kind of knowledge acquired and refined through the iterative practice of "doing" and over the time, it becomes a continuous learning process depending to the context in which we operate and it is tied to people that maintain it. However, the process of 'know-how sharing' offers the possibility to give a real social and economic emancipation to practical experience and to tacit knowledge embedded in people. This possibility could allow the start of a collective and participative development of competences, abilities and skills usually belonging to a stakeholder's personal realm. In order to have good know-how sharing, it is necessary to have appropriately designed tools, which are able to codify, support and amplify this process. Among most advanced products available, communicative tools and collaborative networks are recognized as those mostly able to guarantee information management and an amplification

https://doi.org/10.6084/m9.figshare.8115818

of communicative data. The paper describes how communication tools and collaborative networks can be used to share this particular kind of unspoken knowledge at interpersonal level. Starting from the analysis of the communicative process related to tacit knowledge, the study proposes a new process for sharing tacit information and introduces some strategic and communicative solutions, as well as some design scenarios related to knowledge sharing in emerging countries and developing economies.

Keywords: ***Tacit Knowledge Sharing • Communicative Exchange Processes • Communication Tools • Collaborative Networks • ICTs • Design Solutions in Emerging Countries.***

Introduction

Contemporary network society is largely based on the use of ubiquitous ICTs, on networks and on the use of personal communication tools. During recent decades they have allowed people to share, in an easy and democratic way, their knowledge in the form of information, definitions and operating procedures.

Even though the most diffused forms of knowledge are "explicit" (i.e.: shareable facts, communicable notions, etc.), "tacit" knowledge (i.e.: experiences, skills, etc.) is very important because it is strictly tied to the manual doing and to the fulfillment of actions with practical purposes (Sennett, 2008). Tacit knowledge is intended as a particular type of procedural knowledge incorporated within people, and by its nature, it expresses undoubted communicative and representative

https://doi.org/10.6084/m9.figshare.8115818

problems, both from the point of view of interpersonal communication and during the process of sharing with other people. This is due to the fact that people must explain their experience and what they know, through to use common and traditional mediums, such as speech or signs, that are not suitable to achieve this purpose (Ryle, 1949; Polanyi, 1966).

For these reasons, it can be shared almost exclusively through emulative, repetitive and learning-by-doing processes. In emerging countries this seems so limited due to; the distances among people, the linguistic differences, the impossibility for stakeholders to be physically close, and the lack of ad-hoc and well-designed procedures and tools able to share and convert tacit knowledge into explicit knowledge.

Communication tools and collaborative networks can help to support the sharing knowledge process through innovative and low environmental impact design solutions. The positive impacts that they already have in everyday life suggest that, if we could conceive operative knowledge sharing processes, applicable for example to the design of communicative solutions, the spread of well-codified tacit information can surely amplify and maximize the impact into all society.

So, considering social, economic and industrial backgrounds, emerging countries have become a privileged ground for testing new sustainable communicative solutions to share tacit knowledge. The exchange of experience-based information could contribute to increasing human wealth (Manzini and Jegou, 2003) in terms of security, work learning and in the improvement of manual experiences, that are recognised as pillars of the "context-based" Sustainable Development.

https://doi.org/10.6084/m9.figshare.8115818

Aims

The paper shows early results of a theoretical and methodological study aiming to describe how communication tools and collaborative networks can be used to share tacit knowledge at interpersonal level. In particular specific paper aims are:

- ***Proposing an operative knowledge sharing process applicable in the design of communicative solutions.***
- ***Showing how to identify guidelines in designing communicative tools and collaborative networks for sharing tacit knowledge at interpersonal level.***
- ***Proposing new strategic scenarios and sustainable communicative design themes related to knowledge sharing problems in emerging countries***

Methodology

The research was conducted following a logical path divided into three different phases listed as follow:

- ***The first phase analyzes, from the communicative point of view, characteristics of knowledge and the communicative process related to tacit knowledge considering intrinsic problems and strengths.***
- ***The second phase proposes a simplified process for sharing tacit information and experience; it is created from the reinterpretation and the extension of one among most common and popular methods used in Knowledge Sharing and Knowledge Management literature.***
- ***The third phase demonstrates benefits and potentialities of the new sharing knowledge methodology, in the definition of***

https://doi.org/10.6084/m9.figshare.8115818

design guidelines to be applied to communicative tools and collaborative networks.

Characteristics of the Tacit Knowledge's Communicative Process

In the sharing of tacit knowledge, one of the most important elements concerns the communication – also known as representation – at interpersonal level (Nonaka and von Krogh, 2009). So, good communication is really important because it enables to share with others, what we know and what someone has acquired over time through slow processes of personal experience-based synthesis and reflection.

However, as Michael Polanyi (1966) stated, interpersonal communication of tacit knowledge is also the main problem in the overall sharing process. Moreover, the problem concerns the necessity to communicate what, by its nature, cannot be communicated with common communication apparatus such as speech, signs, or today, through digital social sharing techniques. This aspect, indeed limits the potential applications of tacit knowledge, because the diffusion of information is confined in a strictly local dimension.

From a strictly communicative point of view, it is possible to identify some relevant critical elements characterizing good process of knowledge sharing. Among these, two are fundamental. A first element concerns the physical proximity between who owns knowledge and those who want receive it. About this, one of the most common and spontaneous sharing ways consists in the direct emulation through a very close observation (Nonaka, 1994), and the subsequent replication with learning-by-doing attempts. A second element concerns the

https://doi.org/10.6084/m9.figshare.8115818

linguistic incompatibility between stakeholders involved in the knowledge sharing process. Indeed, possible forms of incompatibility limit people's collaborative aptitude and their involvement in task fulfilment (Kauppila, Rajala and Jyrämä, 2011).

A proper enabling tacit knowledge sharing process offers the possibility to give a real social and economic value to practical experiences and tacit knowledge embedded in people. This possibility could allow generation, through bottom-up processes, a collective and participative development of competences, abilities and skills usually belonging to stakeholders' personal realm, in the perspective of a Sustainable Development of context-based wealth conditions (Manzini, 2002; 2003).

Defining a Communicative Exchange Process for Tacit Knowledge Sharing

In economic sciences, since the 1990's, the matter of interpersonal tacit knowledge sharing has been a predominant research theme. In this field, the main contributions of the conversion processes from tacit knowledge into explicit ones have been gained from the works of Ikujiro Nonaka and Hirotaka Takeuchi (1995). In their research, authors have defined a new model – the so-called SECI Model – able to describe how tacit knowledge can be transformed into explicit knowledge.

SECI is the acronym of "Socialization", "Externalization", "Combination" and "Internalization". In detail, it is a model developed to describe how social dynamics, which are at the base of the creation of knowledge in organizations, are articulated. The model is represented by a spiral diagram describing four stages of process flows of combination and conversion of knowledge. It

https://doi.org/10.6084/m9.figshare.8115818

allows the description of how this flow can be converted from a tacit and incorporated knowledge form, into an explicit and shared one. As Figure 1 shows, we have: "Socialization" (from tacit knowledge to tacit knowledge), "Externalization" (from tacit knowledge to explicit knowledge), "Combination" (from explicit knowledge to explicit knowledge) and finally, "Internalization" (from explicit knowledge to tacit knowledge). (Nonaka and Toyama, 2003)

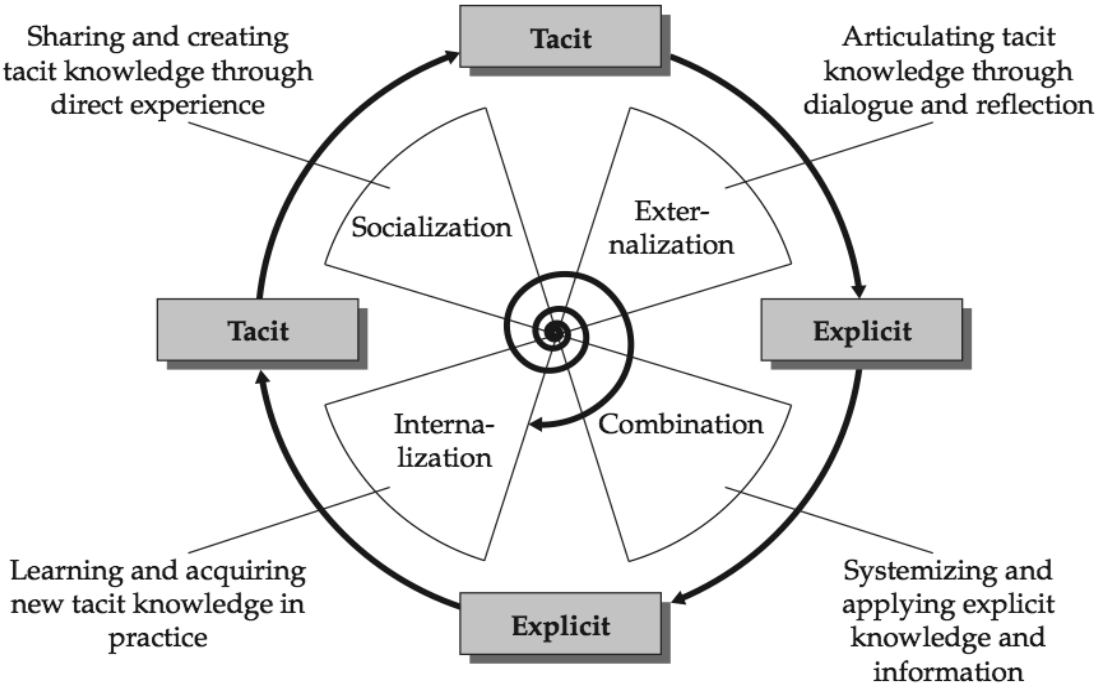

Figure 1: The SECI Model spiral diagram. (Takeuchi, 2006).

Even though SECI Model clearly describes the way to convert tacit knowledge into explicit knowledge, it doesn't provide clear and detailed information about the specificity of each stage. In addition, this Model seems inapplicable to communication tools and collaborative networks – due to the fact that it isn't conceived

https://doi.org/10.6084/m9.figshare.8115818

for them – and so it seems essential to try to create a new SECI-based Model applicable to these new communicative paradigms.

The definition of a new communicative exchange process for tacit knowledge sharing is built starting from the SECI Model. Some common Knowledge Sharing discipline techniques such as: After Action Review, Mind mapping, Experience Capitalization, Knowledge Fairs, etc. (Knowledge Sharing Toolkit, 2012), integrate its concepts and enable us also to track new hypothetical design solutions.

Results obtained from this new communicative exchange process for tacit knowledge sharing are shown in Table 1, which contains the four SECI's stages (left) and new twelve detailed principles (right) applicable to the design of communicative artifacts for converting tacit knowledge into explicit knowledge.

Table 1: The new twelve principles for sharing tacit knowledge.

SECI Phases	New Principles for Sharing Tacit Knowledge
SOCIALIZATION (Tacit-to-Tacit)	• **Designing databases for collecting and organizing tacit knowledge.** • **Creating the knowledge background necessary to generate the whole model (providing available knowledge within database).** • **Representing and guiding existing tacit knowledge, its themes and aims using the most simple and comfortable communication methods.** • **Starting the sharing process of collected tacit knowledge using proper communicative tools (the choice depends on the task, from the**

https://doi.org/10.6084/m9.figshare.8115818

	activity, from expected outputs, from audience capabilities)
EXTERNALIZATION (Tacit-to-Explicit)	**5. Using personal syntaxes or mind maps for conceptualizing and fixing tacit knowledge.** **6. Thinking in a critical way about the quality of obtained results.** **7. Explicit acquired knowledge for creating the right stakeholders involvement in the topic.** **8. Developing and supporting over time the network of collaborations through effective feedbacks and stimuli**
COMBINATION (Explicit-to-Explicit)	**9. Allowing collaborative peer-to-peer folksonomies on formalized knowledge in order to verify the led process and prevents further errors.** **10. Disseminating among stakeholders explicit knowledge until now acquired in order to affirm the grade of right information gained.** **11. Promoting explicit knowledge for stimulating common discussions and allowing other personal acquisitions**
INTERNALIZATION (Explicit-to-Tacit)	**12. Organizing present explicit notions for starting the process of personal incorporation and replication (verify the lesson learned – translating explicit knowledge into tacit knowledge)**

Detecting Communicative Tools and Collaborative Networks' Design Guidelines for Sharing Tacit Knowledge

https://doi.org/10.6084/m9.figshare.8115818

From the theoretical application of the new twelve principles for sharing tacit knowledge it is possible to identify, both for communicative tools and for collaborative networks, a set of design guidelines for designing communicative artefacts able to facilitate sharing knowledge processes.

Being a theoretical application, it is important to understand how the application of the twelve principles can support the design of new and evolved products for sharing tacit knowledge. For these reasons, for both cases a brief methodological experimentation will be shown in order to demonstrate potentialities and improvement in design activities.

In the design of communicative tools, such as personal devices, tablets or wearable displays, Dan Saffer (2006) suggests that an important aspect must be to take into account concerning the right design of input interface, because it mediates users' communications. So, applying the third and the fifth principle of knowledge sharing in the design of communicative digital interfaces, we can detect interesting design guidelines reported in Figures 2 and 3

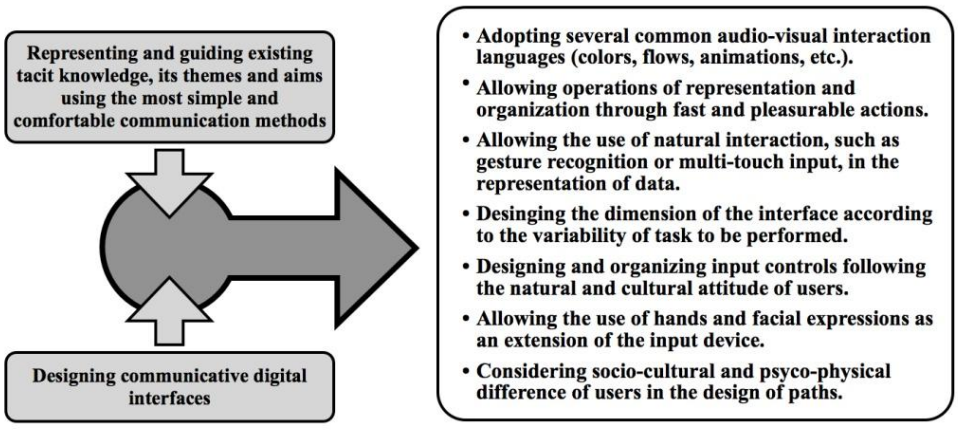

Figure 2: Design guidelines for creating communicative digital interfaces for representing existing tacit knowledge

https://doi.org/10.6084/m9.figshare.8115818

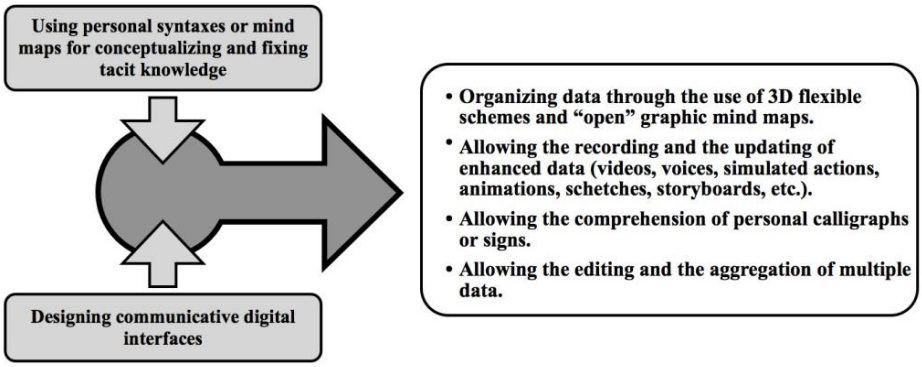

Figure 3: Design guidelines for creating communicative interfaces for allowing the use of personal syntaxes for conceptualizing tacit knowledge.

On the other hand, in the design of collaborative networks it has been demonstrated (Meroni, 2007; Jégou and Manzini, 2008) that the creation of open services aimed to generate self-aggregations of stakeholders' competences and skills, is an aspect to be taken into account in the network generation. So, applying the ninth principle of knowledge sharing in the design of such open services, we can identify the design guidelines shown in Figure 4.

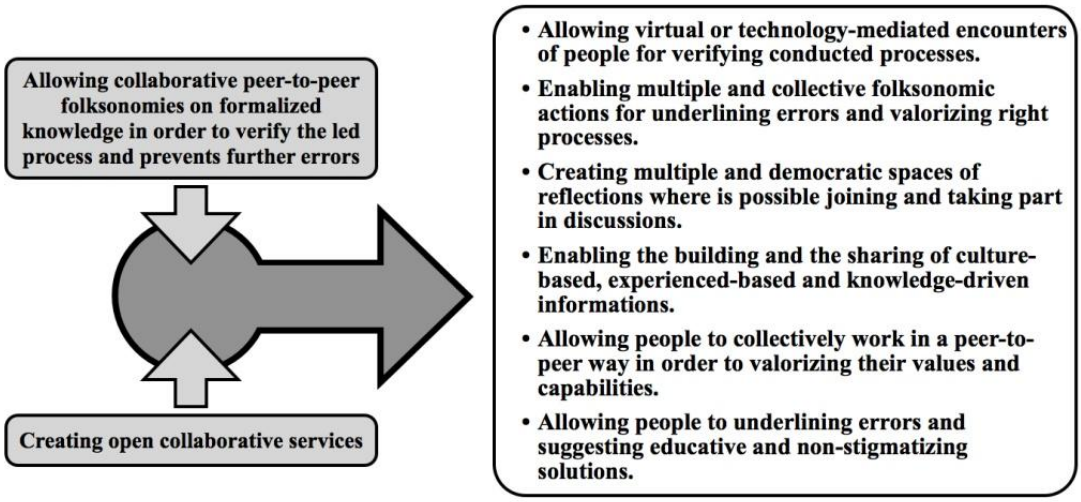

Figure 4: Design guidelines for creating open collaborative services for validating formalized explicit knowledge.

https://doi.org/10.6084/m9.figshare.8115818

Findings

Interdisciplinary design findings obtained from the research have allowed us to define a new communicative SECI-based exchange process for sharing tacit knowledge, at interpersonal level, among stakeholders. The research has gained two main findings.

The new sharing principles clarify the strategic aims contained in the SECI Model and they are able to trace new practical ways (communicative tools solutions and collaborative network strategies) about how to share tacit knowledge.

Early theoretical applications of the new communicative exchange process in the design of communicative artifacts have demonstrated that is possible to ideate some design guidelines more oriented on the real problems of the communicative process.

As the paper has shown, through the use of a proper sharing method, it is possible to reuse and spread tacit knowledge among stakeholders through the use of ubiquitous ICTs such as communicative tools and collaborative networks

Discussion

The main discussion proposed by the research concerns possible applicative opportunities, resulting from the application of new sustainable communicative solutions, for sharing tacit information in emerging countries and developing economies. In such countries (i.e.: "BRIC", "Next Eleven" or "CIVET") existing economic, social and technological backgrounds offer, probably for the first time, the real possibility of designing and testing new and evolved communicative solutions, in order to promote new ideas of human wealth. As argued by Ezio Manzini and François Jégou (2003), the exchange of experience-based information is a

https://doi.org/10.6084/m9.figshare.8115818

relevant part of the so-called "transition process toward the sustainable society". A new way of living where local values, people involvement, the sharing of nearby services, and the diffusion of local knowledge and skills constitute the pillar of a new "context-based" idea of well-being, and then, a new "context-based" idea of Sustainable Development.

Considering economic impacts, social benefits and technological improvements gained from market vitality, population growth, purchasing power, the rise of middle class and consumer connectivity (Florida, 2002), in the scenario of emerging economies the applications of the new communicative exchange process for tacit knowledge sharing with the paradigms of new communicative tools and collaborative networks suggest new design strategies and opportunities of development, mainly in three relevant and strategic areas of society. The aims of the following three parts is to present the positive benefits that could be made by the adoption of this methodological combination in the everyday living scenarios.

The first area concerns the medical field. Even though in emerging countries personal care is on the rise, the gap between metropolitan areas and rural communities, intended in terms of physical distance, linguistic differences, lack of infrastructures, etc., is still a weakness. In the field of safety and personal care, the exchange of basic practical information about how to prevent common diseases, such as AIDS, cholera, pneumonia or typhoid fever, is recognized as the key to prevent a large number of deaths and illnesses, mainly among young people, the elderly and children. The combined use of communicative tools, for example, for doctors or village chiefs, with a collaborative network for sharing information about illness cases, could resolve an important problem in emerging countries, especially for rural

https://doi.org/10.6084/m9.figshare.8115818

areas. Enabling people to act in first aid situations will generate positive effects. For example:

- ***It could allow developing competences about common risk situations.***
- ***It could provide the sharing of information about how to deal with specific risk situations and allow essential decisions to be taken.***
- ***It could allow the creation of debate platforms about the right and the best way to conduct prevention campaigns, in order to verify the effectiveness of care policies among rural, or marginal areas, and main towns.***
- ***It could provide an amount of data about illness diffusions.***
- ***It could generate a large and perceived sense of care: people feel safe and protected, they are able to self-monitor their own life and own health condition, they can share what they know or what they have had, people actively participate in the activity of diffused care.***
- ***It could stimulate in youth, the sense and the essence of medical practice careers through low-impact distance self-learning technologies.***

The second area sector concerns the food field. The term of "emerging countries" quite often is equivalent to demographic growth; so in growing areas, sharing experience-based knowledge about food cultivation and about the importance of correct nutrition can contribute both to recovering food traditions in the perspective of sustainable growth and in reducing unequal food supply chains. Combining communicative tools and collaborative networks for sharing knowledge about the production of simple products and their treatment, could resolve the prominent problem of food crisis, for example in overcrowded contexts or, on

https://doi.org/10.6084/m9.figshare.8115818

the other hand, in poor ones. Moreover, enabling people to reuse practical knowledge about nutrition could lead to consciously self-produced food products and create small and local sustainable markets. For example:

- ***It could allow people to understand the value of proper nutrition, stimulating awareness of the medical importance of diversified and locally-based food programs.***
- ***It could allow foreign food cultivations in order to revitalize disadvantaged contexts, such as those that still live in rural conditions.***
- ***It could allow the creation of multimodal markets, both virtual and real, for the production, selling, buying and consumption of food.***
- ***It could allow for the learning and understanding of the best ways to start local low-footprint food economies.***
- ***It could allow the preservation of cultural food traditions, such as the handing down of food heritages belonging to forefathers and which can conserve local identities.***

Finally, the third area concerns the job field. As it is imperative to understand, the reuse of tacit knowledge can foster the improvement of work ability in everyday jobs. In emerging countries, the service industry is rapidly growing to the detriment of basic fields of work. The implication of this may be that practical knowledge about essential jobs could become lost. The combined use of collaborative tools and collaborative networks could contribute to restart a new educational phase about job employment through the sharing of practical information about first aid competences. This could be used in both "basic" fields, such as fishing, textiles, local arts, woodwork, etc., and in "highly specific" fields such as the construction industry, goldsmith's art,

https://doi.org/10.6084/m9.figshare.8115818

hydraulics, etc. In the perspective of a self-reorganization of competences in society, for example:

- ***It could provide the opportunity to share practical competences, skills and best practices in market-oriented contexts for sustaining local growths.***
- ***It could allow the starting of new knowledge-based enterprises and building new supply infrastructures for covering the demand of services, competences and solutions.***
- ***It could allow for the learning of new jobs to cover the demand of specific competences in specific contexts.***
- ***It can allow the availability and sharing of knowledge from people now in retirement, to give opportunities to new generations of workers to compensate the normal turnover in a specific market area.***

Conclusions

As it has been argued in this paper, the reuse of tacit knowledge in ICTs, can be considered a real way to be taken into account for the transition towards a sustainable society.

The problem of interpersonal communication of tacit knowledge, such as experiences or skills, offers the real opportunity to work on new and unexpected design issues not considered before. This claim reveals an immense potential, mainly in developing countries, if we consider the positive effects that explicit and clear information have on the economic, technological and social dimensions.

https://doi.org/10.6084/m9.figshare.8115818

Acknowledgments

This paper contains extracts of the paper presented by the author in 2013 at the Gaborone International Design Conference.

References

Florida, R. (2002). The rise of the creative class: And how it's transforming work, leisure and everyday life. New York: Basic Books.

Jégou, F. and Manzini, E. (2008). Collaborative services: Social innovation and design for sustainability. Milan: POLI.design.

Kauppila, O-P., Rajala, R. and Jyrämä, A. (2011). Knowledge sharing through virtual teams across borders and boundaries. Management Learning: The Journal for Managerial and Organizational Learning, 42 (4), 395-418.

Knowledge Sharing Toolkit. (2012). KS Methods. Retrieved April 30, 2013, from http://www.kstoolkit.org/KS+Methods.

Manzini. E. (2002). Context-based wellbeing and the concept of regenerative solution: A conceptual framework for scenario building and sustainable solutions development. The Journal of Sustainable Products Volume 2, (3-4), 141–148.

Manzini, E. (2003). Scenarios of sustainable well-being: Design Philosophy Papers 1 (1), 1-13.

Manzini, E. and Jégou, F. (2003). Sustainable everyday: Scenarios of urban life. Milan: Edizione Ambiente.

Meroni, A. (2007). Creative communities: People inventing sustainable ways of living. Milan: POLIdesign.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. Organization Science, 5 (2), 14-37.

Nonaka, I. and Takeuchi, H. (1995). The knowledge-creating company: How japanese companies create the dynamics of innovation. New York: Oxford University Press.

Nonaka, I. and Toyama, R. (2003). The knowledge-creating theory revisited: Knowledge creation as a synthesizing process. Knowledge Management Research & Practice 1 (1), 2-10.

Nonaka, I. and von Krogh, G. (2009). Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. Organization Science, 20 (3), 635-652.

Polanyi, M. (1966). The tacit dimension. London: Routledge.

Ryle, G. (1949). The concept of mind. Chicago: University of Chicago Press.

Saffer, D. (2006). Designing for interaction: Creating innovative applications and devices. Berkeley: New Riders.

Sennett, R. (2008). The craftsman. New Haven: Yale University Press.

Takeuchi, H. (2006). The new dynamism of the knowledge-creating company. In H. Takeuchi and T. Shibata (Eds.), Japan, moving toward a more advanced knowledge economy: Volume 2 – Advanced knowledge-creating companies (pp. 1-9). Washington D.C.: World Bank Institute.